MATERIAL SAFETY DATA SHEET

SRM Supplier: **National Institute of Standards and Technology**
Standard Reference Materials Program
100 Bureau Drive
Gaithersburg, Maryland 20899

SRM Number: 3061
MSDS Number: 3061
SRM Name: Chloral Hydrate in Methanol

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Chloral Hydrate in Methanol

Description: SRM 3061 consists of two 5-mL ampoules containing approximately 2.5-mL of a solution of chloral hydrate in methanol.

Other Designations: **Chloral Hydrate** (trichloroacetaldehyde monohydrate; 2,2,2-trichloro-1,1-ethanediol; trichloroacetaldehyde hydrate; *Aquachloral**; *Chloraldurat**; *Lornal**; *Noctec**; *Nycoton**) in **Methanol** (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol; *Colonial Spirit**; *Columbian Spirit**; *Pyroxylic Spirit**)

Name	Chemical Formula	CAS Registry Number
Methanol	CH_3OH	67-56-1
Chloral Hydrate	$Cl_3C_2H(OH)_2$	302-17-0

DOT Classification: Methanol, UN1230 (Small Quantity Exemption)

Manufacturer/Supplier: Available from a number of suppliers

* Trade name

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methanol	99	ACGIH TLV-TWA (skin): 200 mg/kg or 262 mg/m^3
		OSHA TLV-TWA (skin): 200 mg/kg or 262 mg/m^3
		Human, Inhalation: TC_{LO}: 86 000 mg/m^3
		Human, Inhalation: TC_{LO}: 300 mg/kg
		Human, Oral: LD_{LO}: 143 mg/kg
		Man, Oral: TD_{LO}: 3429 mg/kg
		Rat, Oral: LD_{50}: 5628 mg/kg
Chloral Hydrate	1	No occupational exposure limits established
		Human, Oral: LD_{LO}: 4 mg/kg
		Rat, Oral: LD_{50}: 479 mg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methanol	Chloral Hydrate
Appearance and Odor: a clear, colorless liquid with a characteristic alcoholic odor	**Appearance and Odor:** colorless to white solid with an irritating odor
Relative Molecular Mass: 32.04	**Relative Molecular Mass:** 165.40
Density: 0.7914 g/mL	**Density (water = 1):** 1.9081
Boiling Point: 65 °C	**Boiling Point:** not applicable
Freezing Point: -94 °C	**Freezing Point:** not available
Vapor Pressure (@ 20 °C): 97.25 mm Hg	**Vapor Pressure:** not applicable
Evaporation Rate (butyl acetate = 1): 4.6	**Evaporation Rate:** not available
Viscosity (@ 20 °C): 0.59 cP	**Viscosity (@ 20 °C):** not available
Water Solubility: soluble	**Water Solubility (@ 25 °C):** 830 %
Solvent Solubility: soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, and most other organic solvents	**Solvent Solubility:** soluble in alcohol, ether, acetone, benzene, pyridines, chloroform, olive oil, glycerol, carbon disulfide, methyl ethyl ketone, turpentine, and toluene

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this methanol/chloral hydrate solution **DO NOT** exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Methanol
Flash Point: 11 °C **Method Used:** Closed Cup **Autoignition Temperature:** 385 °C

Flammability Limits in Air (Volume %): **UPPER:** 36
LOWER: 6.0

Unusual Fire and Explosion Hazards: Methanol is a severe fire and explosion hazard when exposed to heat or flame. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor and air mixtures are explosive.

Chloral hydrate is a slight fire hazard.

Extinguishing Media: Use alcohol-resistant foam, dry chemical, carbon dioxide, or water spray.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: **X** **Stable** _____ **Unstable**

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Avoid contact with the skin. Do not allow the material to contaminate water sources.

Incompatibility (Materials to Avoid): This material is incompatible with halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, bases, and acids.

See Section IV**:** *Unusual Fire and Explosion Hazards*

Hazardous Decomposition or Byproducts: Thermal decomposition products of methanol may include toxic oxides of carbon. Thermal decomposition products of chloral hydrate may include phosgene, halogenated compounds, and oxides of carbon.

Hazardous Polymerization _____ **Will Occur** **X** **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **X** **Inhalation** **X** **Skin** **X** **Ingestion**

Methanol: Methanol is a fatal poison. This material is harmful if inhaled or absorbed through skin. Ingestion may be fatal or cause blindness. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause damage to the eyes, liver, heart, and kidneys. Methanol may also cause gastrointestinal disturbances, convulsions, and/or nerve damage.

Chloral Hydrate: Inhalation of low levels of chloral hydrate can cause throat irritation and shortness of breath. If sufficient exposures occur, severe irritation of the respiratory tract is possible. Animals exposed to chloral hydrate exhibited reduction of kidney function, a change in central nervous system function, and a decrease in antitoxic and enzyme-synthesizing function of the liver. Slowed growth rate, leukocytosis, and changes in arterial blood pressure were also observed in experimental animals. Skin and/or eye contact with this material may cause irritation and redness. Repeated or prolonged exposure to the skin may cause dermatitis. Repeated or prolonged exposure to the eye may cause conjunctivitis.

Ingestion of large amounts of chloral hydrate can cause ataxia, confusion, drowsiness, areflexia, and anesthesia. Other symptoms may include shallow and slow or rapid respiration, hypotension, and cold and clammy skin. A skin rash may appear after an overdose. The corrosive action may cause gastritis with nausea and vomiting, severe hemorrhagic gastritis, gastric necrosis, enteritis, and esophagitis. Hepatic, renal, and cardiac damage have also been reported. Chronic ingestion has caused reproductive effects in animals. Administration to mice resulted in a statistically significant increase in the incidence of carcinogenic tumors of the liver. Chloral hydrate crosses the placenta and is excreted in breast milk.

Medical Conditions Generally Aggravated by Exposure: Methanol may affect eye disorders, kidney disorders, skin disorders, and allergies.

Chloral hydrate may affect allergies, eye abnormalities, kidney, liver, respiratory, and skin disorders.

Listed as a Carcinogen/Potential Carcinogen (Methanol):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

Listed as a Carcinogen/Potential Carcinogen (Chloral Hydrate):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs*		X
By the Occupational Safety and Health Administration (OSHA)		X

*IARC classifies chloral hydrate as Group 3: *Human Inadequate Evidence*; *Animal Limited Evidence*

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: **Methanol:** central nervous system (CNS)
Chloral Hydrate: immune system (sensitizer) central nervous system (CNS)

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Stop the leak if one can do so without risk. Absorb small spills with sand or other absorbent material and place into containers for disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

> **NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in a cool, dry, well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources:
MDL Information Systems, Inc., MSDS *Chloral Hydrate*, 22 March 2001.
MDL Information Systems, Inc., MSDS *Methyl Alcohol*, 22 March 2001.
Merck Index, 11th Ed., 1989.
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.